as being unpatentable in view of Nikitin in view of Anderson and Elton et al (U.S. Patent No. 5,036,165, hereinafter Elton); and Claims 24 and 25 were rejected as being unpatentable over Nikitin in view of Anderson and Simmons et al (U.S. Patent No. 4,997,995, hereinafter Simmons).

The interview granted by Examiner Waks, Examiner Enad, and SPE Ramirez on March 1, 2000, is hereby gratefully acknowledged. During the interview, the pending claims and the asserted prior art were discussed, a summary of which is provided below. An agreement was not reached as it was the Examiner's position that the cables disclosed in the asserted prior art are equivalent to the claimed windings in that they have a feature of "enclosing an electric field".

A Letter Requesting Approval of Drawing Changes and Letter Requesting Approval of New Figure are filed herewith, amending Figures 1, 3 and 6, and adding new Figure 10. Figure 1 has been amended to add a rotor, Figure 3 has been amended to show the predetermined distance of insertion, Figure 6 has been amended to show a slotted elongated member and Figure 10 has been added to show an elongated member having small conductors. The specification has been amended to provide a consistent description with the amended figures. As each of the features in the amended figures is supported in the originally filed specification, no new matter is added.

In paragraph 2 of the outstanding Office Action a comment is made regarding the specification being objected to because it refers to drawing Figure "12". However, it is respectfully submitted that the originally filed application does not contain this informality, but merely the "clean copy" that was filed for the Examiner's convenience. The clean copy included Figure "12" as a typographical error and thus should be ignored.

The specification has been amended to address the several items in paragraph 3 of the

outstanding Office Action.

Regarding the rejection of Claims 14 and 15 the language found objectionable in these claims has been deleted, so as to overcome the rejection. Because Figure 6 has been amended to show the slotted features on the elongated member, and Figure 10 has been added to show the bundle of small conductors, it is believed these claims are adequately supported by the specification. With regard to the combined cross-sectional area, adequate support is found in the specification, namely at page 5, line 13, referring to a cross-sectional area of 100 mm^2 as an example. Thus it is believed Claims 16 and 17 comply with 35 U.S.C. §112, first paragraph.

Regarding Claims 18-20, Claim 18 has been amended to remove the reference to the elongated member and replace the same with the high-voltage cables as indicated in the outstanding Office Action.

Regarding Claim 22 it is respectfully submitted that page 3, lines 34-36 and Figure 2 provide an enabling description with regard to the fault current control device being configured to mechanically stabilize the set of windings, and thus it is respectfully submitted that Claim 22 complies with 35 U.S.C. §112, first paragraph.

The claims have been amended to address the rejection under 35 U.S.C. §112, second paragraph. However, if the Examiner disagrees, the Examiner is invited to telephone the undersigned so that mutually agreeable claim language may be identified.

As discussed in the interview, Claim 26 was rejected as being anticipated by Nikitin. Applicants traverse this rejection. Claim 26 defines a rotating electric machine that among other things includes "means for controlling a fault current and for conducting said fault current to ground in an end winding region of said set of windings". Also discussed during the interview, was that the "means for controlling a fault current" includes a feature that the

winding actually be in contact with an element connected to ground.

As discussed in the interview, a feature of the present invention is that the semiconducting outer layer of the cable is grounded (page 2, lines 21-24) so that the electric field in the end winding region is reduced to zero or close to zero as a result of this grounding. By grounding the outer semiconducting layer, the electric field is contained within the cable. Furthermore, the mechanism by which the outer semiconducting layer is grounded, also allows for electric arcs to be directed to ground in the event of an internal fault (see e.g., pages 3, lines 4-8 and page 2, lines 14-18). By controlling the electric field in the end winding region, it is possible according to the present invention to insert conductive materials next to the windings and in contact with the windings to provide a mechanism to handle short-circuiting in arcing events.

The "means" element has been drafted to invoke an interpretation under 35 U.S.C. §112, sixth paragraph. Accordingly, is it appropriate to turn to the structures, materials and acts disclosed in the specification in order to interpret this claim element. As shown in Figure 2, separate cables windings 12 have connected thereto an elongated member 10. The elongated member 10 connects to outer-semiconducting layers 28 of the cables 12 and thus are electrically connected to each other (page 5, lines 23-27). Interconnecting the electric field-confining cables in the end winding region in this manner grounds the outer semi-conducting layers of the cables thus making fault current control possible. In contrast, conventional rotating machines experience substantial electric fields in the end winding region and therefore it is not possible to insert non-insulated conductive material in the end-winding region due to the strong electric fields (see, e.g., page 2, lines 17-19).

Nikitin is directed to a stator of a generator that includes half windings 7 and 8 as shown in Figure 3 for example. Elements of the half windings (see, e.g., element 6 in Figure

4 for example) have contained thereabout an insulation sleeve 14 that has hollow projections 15 on the internal surfaces. The part of each insulation sleeve 14 that extends outside of the stator slot includes a cylindrical portion 22 and a cone-shaped cable-type termination 23 of a predetermined size that is reinforced with a "current-carrying layers 24" (column 3, lines 21-26). The current-carrying layers 24 make it possible to produce a slightly non-uniform electric field which eliminates the possibility of a flow of current from the surfaces of the element 6 of the half winding 8 (column 3, lines 50-53). Thus, the device in Nikitin purposefully forms an electric field and thus cannot be construed as a high voltage cable that encloses the electric field.

The Examiner asserted in the interview that Nikitin describes a device that contains the electric field. The undersigned does not understand this argument since Nikitin employs a current-carrying layer 24 that has a voltage contained thereon that would necessarily produce and emit an electric field. Nikitin explains that the current-carrying layers 24 produce a slightly nonuniform electric field (see e.g., column 3, lines 50-53). Accordingly, it is not understood why Claim 26 remains rejected over the asserted prior art, when it is clear from the express teachings of the asserted prior art that the asserted prior art does not contain all of the elements of the claimed invention.

Comparing Claim 26 with Nikitin, Claim 26 requires a set of windings having high voltage cables enclosing an electric field. In contrast, as discussed above, Nikitin does not disclose a device that encloses an electric field, but describes a device that has an opposite attribute -- it produces an electric field. Furthermore, Claim 26 requires means for controlling a fault current. As previously discussed, the means includes a non-insulated, grounded conductor disposed against the cable in the end-winding region where the non-insulating conductor is grounded. In contrast because Nikitin does not contain the electric

field, it is not possible to include uninsulated conductors against the cables and ground the same. It is noted that the "current-carrying layers 24" in Nikitin are placed in insulation sleeves 14. Thus it is respectfully submitted that Nikitin neither teaches nor suggests the high-voltage cables that enclose an electric field nor the "means for controlling" of Claim 26 and therefore does not anticipate Claim 26.

Claim 13 stands rejected as being obvious over the combination of Nikitin in view of Anderson. Applicants traverse this rejection. Claim 13 includes the set of windings having high-voltage cables that enclose an electric field in the windings (discussed above). Claim 13 also includes a fault current control device that includes an elongated member of an electrically conducting material connected to ground and disposed in the end winding region. As previously discussed, Nikitin does not disclose cable windings that enclose an electric field, and so it is not possible for Nikitin to employ an uninsulated conductor in the end winding region (a typical problem for conventional devices as discussed in the specification at page 2, lines 19-24). Anderson is asserted for disclosing an "elongated member 5" that is connected to ground and disposed in an end winding region for the purpose of preventing a glow discharge from the coil end. However, as is the case with Nikitin, and as discussed during the interview, Anderson does not meet the provision of Claim 13 in that the device in Anderson does not enclose the electric field. Furthermore, the elongated members identified as members 5 in the outstanding Office Action are in fact the coil sides 5 of the conductor as seen in Figure 1a of Anderson. Certainly these conductors should not be grounded because it would render the device inoperable. During the interview, the Examiner asserted that the "coil 5" is grounded by way of resistor 8 to a machine part 7, which is physically grounded. However, it was explained that by definition, if the resistor 8 is disposed between the coil 5 and the grounded machine part 7, then there would be a voltage differential between the two

structures. As a consequence, the coil 5 would contain a voltage thereon and would generate in emit an electric field, much as is with a conventional antenna.[1] Consequently, no matter how Nikitin is combined with Anderson, all the elements of independent Claim 13 are not found in the combination. Thus, it is respectfully submitted that Claim 13 patentably defines over Nikitin in view of Anderson.

Claims 14 and 15 stand rejected as being unpatentable over Nikitin in view of Anderson and Raschbichler. Raschbichler is directed to a linear motor, which is not a rotating electric machine and so it does not have end winding regions. The distributed architecture of Raschbichler as seen in Figure 1, does not share the same problems as a rotating electric machine to which the present invention is directed and thus even if the elements 5 and 6 as discussed in the outstanding Office Action did equate with the claimed elongating members, it is respectfully submitted that one of ordinary skill in the art would not have been motivated to add these elongated members to a combination of Nikitin in view of Anderson, as discussed above, because neither Nikitin or Anderson contain an electric field, and therefore could not use an uninsulated conductor in the end-winding region. Consequently, one of ordinary skill in the art would recognize that the combination of Nikitin in view of Anderson and Raschbichler does not render obvious the invention of Claims 14 and 15.

Claim 21 stands rejected as being unpatentable over Nikitin in view of Anderson and Auclair. Auclair is merely asserted for its disclosure of a cable fault control device having a conventional flexible wire 16 or 18 that may serve as a ground connector. However, it is

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[1]See e.g. U.S. Patent 5,748,152, which is one of many types of antennas, that use a planar structure fed with an antenna feed 42. Accordingly, the planar structure of the coil 5 which will have a voltage developed thereon, will also serve as an antenna mechanism that generates an e-field emitted from the surface of the coil 5.

respectfully submitted that the ground clamp shown in Auclair will be of relatively little utility in the devices of Nikitin and Anderson which fail to contain an electric field in the end winding portions of the rotating machine. Consequently, it is respectfully submitted that one of ordinary skill in the art would not have been motivated to combine Auclair with Nikitin and Anderson as asserted.

Claim 23 stands rejected as being unpatentable over Nikitin in view of Anderson and Elton. Elton is asserted for its teaching of the high-voltage flexible cable having a current carrying conductor. Elton is actually a divisional patent of U.S. Patent No. 4,853,565 (Elton '565), which provide a more complete explanation of the device disclosed therein. Elton '565 (and also Elton) is directed to a device that uses pyrolyzed glass fiber layer for various insulated electrical conductors (see, e.g., title and abstract). As discussed in the background section, Elton '565 uses pyrolyzed glass because conventional grounding tapes for "heavily insulated electric or windings or armature bars" (column 1, lines 21-22 and 60-62), may become abraded due to vibrations of the armature bar in the stator slot. These conventional tapes are not well suited to bleed off electric charge from outside the cable because the method of manufacturing the tape may change its resistivity value due to placing the armature in a resin bath (column 2, lines 19-21 and column 1, lines 53-57). Furthermore, Elton '565 emphasizes that conventional grounding tapes do not work well on complex structures (column 2, lines 23-30). In order to correct this problem Elton '565 identified a pyrolyzed glass fiber tape that would be wrapped around different types of conductors (e.g., the winding embodiment of Figures 1-6, the power cable embodiment of Figure 7, and the housing embodiment of Figure 8). One of the embodiments in which the pyrolyzed glass fiber layer is used, is a conventional armature bar that as that shown in Figures 1-6 for example. Elton '565 describes in this embodiment that the conductors are windings in an

electric machine and uses the terms "armature bars" or "electrical windings" (column 5, lines 64-65) to describe these conductors. However, another embodiment that uses the pyrolyzed glass fiber layer is a power cable shown in Figure 7, where the power cable uses a semiconducting pyrolyzed glass fiber layer to equalize electric charge on the exterior of the cable. Elton '565 does not interchange the use of the terms "cable" (embodiment No. 2) for "armature bars" or "electrical windings" (embodiment No. 1). There is no teaching or suggestion that one of ordinary skill in the art would have substituted the cable of the embodiments of Figure 7 for the armature bars or windings of the embodiments of Figures 1-6. This is because, until Applicants' invention, the use of cables having an outer semiconducting layer were not recognized as being possible, practical or even feasible in electrical machines that operate at high-voltages. Elton '565 describes yet a third embodiment in which the pyrolyzed glass is used to wrap around a housing of digital electronic equipment (column 7, lines 38-39). As is the case with combining the cable embodiment with the winding in Figures 1-6, Elton '565, or Elton does not teach or suggest exchanging the housing of Figure 8 for the windings of Figures 1-6.

In view of the differences in operation between conventional armature bars and windings that use a pyrolyzed glass tape, and a power cable that uses pyrolyzed glass tape, it is respectfully submitted that one of ordinary skill in the power engineering art would not have been motivated at the time the invention was made to substitute the power cable for the winding since the prevailing thought at the time that the cable wound electric machines would not operate successfully at high-voltages. Furthermore, Elton '565 itself does not teach or suggest the substitution, but merely provides yet another indication that those of ordinary skill in the power engineering art would recognize windings as being a different field of endeavor than power cables and Elton '565 merely describes that pyrolyzed glass

tape may be used in these two different fields of endeavor (namely windings and electric machine and also in power cables).

While the outer surface of the power cable in Elton '165 as discussed above is shown to be grounded, Elton '165 is actually a divisional application based on Elton '565, which explains that the power cable embodiment is a completely separate embodiment than the rectangular winding embodiment of Elton '565. Accordingly, it is respectfully submitted that there is no teaching or suggestion in Elton '165 that the power cable, which is grounded, as shown on the cover figure, may be used in a dynamo electric machine as a winding.

Consequently, in view of this discussion it is respectfully submitted that one of ordinary skill in the art would not have been motivated to substitute the power cable of Elton for the windings in Nikitin and Anderson as asserted. Accordingly, it is respectfully submitted that Claim 23 is not rendered obvious by the asserted combination.

Claims 24 and 25 stand rejected as being unpatentable over Nikitin in view of Anderson and Simmons. Simmons is asserted for its discussion of the method of making an extra high-voltage flexible cable with the reduced insulation. However, the cable in Simmons is not grounded and thus because neither the devices in Nikitin and Anderson contain the electric field, and the device in Simmons is not grounded it is respectfully submitted that no matter how the asserted references are combined the asserted combination does not teach or suggest the invention defined by Claims 24 and 25 which require elements of a set of windings that enclose an electric field and also require a fault control device having an elongated member connected to ground in the end winding region. Accordingly, it is respectfully submitted that Claims 24 and 25 patentably define over the asserted prior art.

Consequently, in view of the present amendment and in light of the foregoing comments, it is respectfully submitted that the invention defined by Claims 13-26, as

amended, is enabled by the specification, definite, and patentably distinguishing over the prior art. The present application is therefore believed to be in condition for formal allowance and an early and favorable reconsideration of this application is therefore requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
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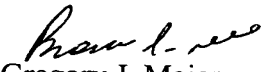

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